

AD-754 044

LUBRICATING AND COOLING FLUID FOR  
ABRASIVE WORKING OF METALS

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Foreign Technology Division  
Wright-Patterson Air Force Base, Ohio

12 December 1972

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FTD-HT-23-1546-72

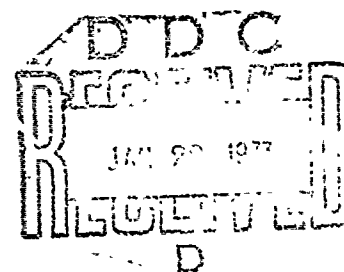
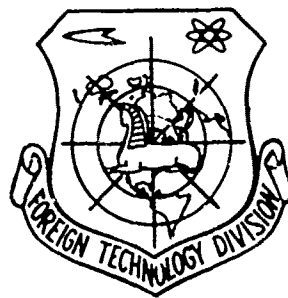
## FOREIGN TECHNOLOGY DIVISION



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by

V. A. Serov, I. L. Brovin, et al.



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UNCLASSIFIED  
Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Foreign Technology Division Air Force Systems Command U. S. Air Force		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	
		2b. GROUP 1	
3. REPORT TITLE  LUBRICATING AND COOLING FLUID FOR ABRASIVE WORKING OF METALS			
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Translation			
5. AUTHOR(S) (First name, middle initial, last name)  Serov, V.A.; Brovin, I.L.			
6. REPORT DATE 4 August 1969		7a. TOTAL NO. OF PAGES 3	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO.		8b. ORIGINATOR'S REPORT NUMBER(S)  WTD-HT-23-1546-72	
a. PROJECT NO. 7343			
c.		8b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
d.			
10. DISTRIBUTION STATEMENT  Approved for public release; distribution unlimited.			
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY  Foreign Technology Division Wright-Patterson AFB, Ohio	
13. ABSTRACT  A lubricating and cooling fluid for the abrasive working of metals was prepd. from an aq. conc. which contained: a water sol. emulsifier 0.1-3.0, a corrosion inhibitor 0.05-0.5, a side product from isoprene production 18-68 wt.%, and halohydrin the balance. AA2016838			



FTD-HT- 23-1546-72

## EDITED TRANSLATION

FTD-HT-23-1546-72

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By: V. A. Serov, I. L. Brovin, et al.

English pages: 3

Source: USSR Patent No. 293040 (Appl. No.  
1356285/23-4, 4 August 1969), 1971,  
2 pages.

Requester: ASD

Translated by: Dean F. W. Koolbeck

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FOREIGN TECHNOLOGY DIVISION  
WP-AFB, OHIO.

FTD-HT- 23-1546-72

Date 12 Dec 19 72

## LUBRICATING AND COOLING FLUID FOR ABRASIVE WORKING OF METALS

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V. T. Sklyar, and V. Ye. Barinov

The proposed invention relates to the composition of lubricating and cooling fluid (LCF) for processes of abrasive metal working.

An existing LCF for abrasive working of metals is based on an aqueous concentrate containing a water-soluble emulsifier and a corrosion inhibitor. However, the use of such a fluid leads to increased wear of the grinding wheel, lowering of workpiece surface quality, and mechanical or metallurgical defects in the treated parts (burns, cracks, and stresses).

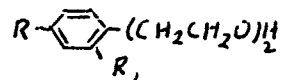
To eliminate the indicated defects it is proposed that the following be added to the LCF composition: a halohydrin, usually chlorohydrin, and SK — a by-product from the production of isoprene by the Prince reaction.

The SK-extract of an aqueous layer of products from condensation by the Prince reaction during the production of isoprene represents a complex mixture of dioxane alcohols, 1.3-diols, and also their derivatives. Product characteristics:  $d_4^{20}$ , 1.094;  $n_D^{20}$ , 1.4587; bromine number, 3.95 g/100 g; acid number, 1.31; saponification number, 17.7; ester number, 6.39 mg KOH/g.

Use is made of water-soluble emulsifiers from the class of nonionogenic, anion- or cation-active SAS - for example, products from the condensation of ethylene oxide and alcohols, fatty acids, phenols or amines, soaps of fatty acids, acetylated amines or their derivatives, etc.

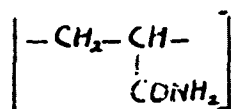
Specific compositions of LCF are given below.

I. Composition	wt. %
glycerin chlorohydrin	80.0
SK by-product from the production of isoprene	18.0
mixture of polyethylene glycol esters of mono- and dialkylphenols of the general formula	2.0



where R is the alkyl residue, containing mainly 8-10 C atoms, R<sub>1</sub> is R or H, and n = 10-12.

II. Composition	wt. %
glycerin chlorohydrin	40.0
SK by-product from the production of isoprene	59.0
salt of monoethanol amine and butyric acid	1.0
III. Composition	wt. %
styrene chlorohydrin	58.0
SK by-product from isoprene production	40.0
mixture of polyethylene glycol esters of oleic alcohol (C <sub>18</sub> H <sub>35</sub> O(CH <sub>2</sub> CH <sub>2</sub> O) <sub>n</sub> H (n = 7)	1.5
corrosion inhibitor - polyacrylamides of the general formula	



0.5

#### IV. Composition

wt. %

mixture of chlorohydrins  
from octene-1 (1-chloro-  
octanol-2 and 2-chloro-  
octanol-1)

25.0

SK by-product from  
isoprene production

72.0

Na salt of the monoamide  
of sebacic acid

3.0

The indicated compositions are prepared by mixing the SK by-product from isoprene production, the halohydrin, and the emulsifier, with agitation and heating. Lubricating and cooling fluids thus obtained are used in the form of a 5% aqueous solution.

Tests of the new LCF composition (I) in grinding operations on tool steel REK10F (hardest-to-work material) showed in comparison with presently used LCF doubled specific productivity; there was also no burning and the quality of the ground surface was increased by two classes.

#### Object of the Invention

1. The lubricating and cooling fluid for abrasive working of metals, based on an aqueous concentrate and containing a water-soluble emulsifier and corrosion inhibitor, *is distinguished* by the fact that in order to increase fluid effectiveness a halohydrin and a by-product from isoprene production are introduced into its composition.

2. The lubricating and cooling fluid in p. 1 *is distinguished* by the fact that the following are introduced into its composition (wt. %): 0.1-3.0 water-soluble emulsifier, 0.05-0.5 corrosion inhibitor, 68-18 by-product from isoprene production, and halohydrin to 100.